

THE IDENTITY AND SYNONYMY OF THE BELOSTOMATIDAE  
(HETEROPTERA) OF JOHANN CHRISTIAN FABRICIUS  
1775-1803

JOHN T. POLHEMUS

University of Colorado Museum, 3115 S. York St., Englewood, Colorado 80110.

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*Abstract.*—The six belostomatid names used by J. C. Fabricius are reviewed. *Nepa grandis* Linnaeus, 1758 (= *Lethocerus grandis*), *Nepa annulata* Fabricius, 1781 (= *Diplonychus annulatus*) and *Naucoris nepoides* Fabricius, 1803 (= *Appasus nepoides*) are not controversial. *Nepa fusca* sensu Fabricius, 1775 (misidentification of *Nepa fusca* Linnaeus, 1758) cannot presently be recognized. Fabricius used the name *Nepa rustica* for two different species of belostomatids from different continents that are both wrongly named according to current usage. *Nepa rustica* Fabricius, 1775, from the New World, is shown to be most likely a senior synonym of *Zaitha stollii* Amyot and Serville, 1843, now known as *Belostoma stollii* (Amyot and Serville). *Nepa rustica* Fabricius, 1787, from India, currently known as *Diplonychus rusticus* (Fabricius), is shown to be a junior synonym of *Nepa plana* Sulzer, 1776. A petition to the ICZN has been prepared to conserve the names *Zaitha stollii* Amyot and Serville, 1843 and *Nepa rustica* Fabricius, 1787 therefore the synonymies are discussed but not proposed here, pending a decision by the ICZN.

*Key Words:* Heteroptera, Belostomatidae, *Diplonychus*, *Belostoma*, synonymy, homonymy

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J. C. Fabricius used six belostomatid species-group names (five as *Nepa* species, one as a *Naucoris* species) in his five major works dealing with Heteroptera at the species level, which are "Systema Entomologiae" (1775), "Species Insectorum" (1781), "Mantissa Insectorum" (1787), "Entomologia Systematica" (1794) and "Systema Rhyngotorum" (1803). His other major taxonomic works, "Genera Insectorum" (1776, including a Mantissa, pp. 209-310) and "Philosophia Entomologica" (1778), did not include belostomatid species.

Only one belostomatid species treated by Fabricius had been previously described, namely *Nepa grandis* Linnaeus, 1758, now *Lethocerus grandis* (L.). There seems to be no disagreement about the identity of this species, or about *Nepa annulata* Fabricius,

1781 (now *Diplonychus annulatus*) from south India, or *Naucoris nepoides* Fabricius, 1803 (now *Appasus nepoides*) from Africa. One species, *Nepa fusca* Fabricius, 1775 (also 1781), must remain a nomen inquerendum, at least for now. The remaining two can be related to modern belostomatid species, but the nomenclature is tortuous.

To put things in perspective, during the period in which Linnaeus and Fabricius worked, genera had the equivalent of modern superfamilies. For instance, the genus *Nepa*, as used by Linnaeus, Fabricius and other authors from 1758 to 1790, included species now assigned to the families Belostomatidae, Naucoridae and Nepidae. The genus *Notonecta* held the remainder of the water bugs known at the time, namely the Corixidae and Notonectidae. Currently there

are 11 families in the Nepomorpha, containing 133 genera.

Fabricius (1790) began the process of dividing the large water bug genera of Linnaeus in his "Nova Insectorum Genera" that included the genus *Ranatra*. In 1807 Latreille published his "Genera Crustaceorum et Insectorum" establishing the currently used major genera of Nepomorpha including *Belostoma*. Latreille (1802) introduced the first nepomorphan family group names, Nepariae and Notonectariae, now emended to Nepidae and Notonectidae, but it remained for Leach (1815) to establish family names for the remainder of the Nepomorpha then known.

Fabricius differentiated between nepids and belostomatids by describing the caudal part of the insect as "N. cauda biseta" for nepids, "N. ecaudata" for belostomatids. The names and cross references (citations) used in Fabricius' species descriptions were not consistent and sometimes unquestionably incorrect. It is clear that he often used the same name for different species (sometimes both belostomatids and nepids) in successive works, so that tying these names to the currently used names has been taxing at best, and extremely difficult in some instances. Decisions regarding the status of names in the early literature are based on the methodology of Thompson and Pont (in press); these authors faced the same dilemma with early names of the genus *Musca* (Diptera), as did van der Vecht (1961) with Fabrician species of the Hymenoptera Sphecoidea.

Below I present evidence to support the resolution of two problems, both dealing with Fabricius' usage of the name *Nepa rustica* for two different species of belostomatids that are both wrongly named according to current usage, a matter that will be submitted to the ICZN. A resolution of this problem is needed for the forthcoming catalog of Palearctic Heteroptera, now in preparation. The species treated here were not dealt with by Stål (1868) in his "Hemiptera Fabriciana" nor Reuter (1888) in his "Re-

visio Synonymica Heteropterorum Palearcticum." Fortunately Zimsen (1964) catalogued the Fabricius heteropteran collections, now mainly held in Copenhagen and London.

***Belostoma rusticum*  
(Fabricius, 1775),  
REVISED CONCEPT**

*Nepa rustica* Fabricius, 1775: 691. Type locality, "America"

*Nepa rustica*: Goeze, 1778: 177.

*Le Paysan Americain*, Stoll, 1780; 11, pl. 1, fig. 1. Provenance, Surinam.

*Belostoma rustica*: Laporte, 1833: 83.

*Zaïtha stollii* Amyot and Serville, 1843: 430.

Type locality, Cayenne (= French Guiana)

*Zaïtha stollii*: Herrich-Schaeffer, 1849: 35, Tab. CCXCII, Figs. 897, 898. Misidentification.

*Nepa rustica*: Herrich-Schaeffer, 1849: 35. (= *Nepa rustica* Fabricius, 1775, in synonymy of *Z. stollii*)

*Zaïtha stollii*: Mayr, 1871: 406, 410.

*Zaïtha stollii*: Walker, 1873: 177.

*Nepa rustica*: Walker, 1873: 177. (= *Nepa rustica* Fabricius, 1775, in synonymy of *Z. stollii*)

*Zaïtha stollii*: Montandon, 1903: 114-115.

*Zaïtha stollii*: De Carlo, 1938: 240.

*Belostoma stollii*: Lauck, 1963: 86. Neotype designation, French Guiana.

Other species referred to as *stollii* or *stolli*. (Mostly from Lauck, 1963)

*Zaïtha stollii*: Mayr, 1863: 352-353. (= *B. testaceopallidum* Latreille)

*Zaïtha stollii*: Signoret, 1863: 581. (Species of unknown identity, *subspinosum* group)

*Zaïtha stollii*: Dufour, 1863: 387. (Species of unknown identity, *subspinosum* group)

*Zaïtha stollii*: Hungerford, 1920: 141. (= *B. testaceopallidum* Latreille)

*Zaïtha stollii*: De Carlo, 1950: 531-532. (Probably *B. testaceopallidum* Latreille)

*Historical notes*: Fabricius (1775) gave

the following description for *Nepa rustica*: "N. ecaudata, corpore fusco, immaculato", "Habitat in Americae aquis frequens", and "Simillima praecedenti, at triplo minor. Corpus totum fuscum, immaculatum, laeve, femoribus solis parum flavescens." By "similar to the preceding, but three times smaller", he was comparing his species to *Nepa grandis* Linnaeus, 1758 (now *Lethocerus grandis*). The latter measures 90–95 mm in length, and his *N. rustica* (= *B. stollii*) typically measures 33–37 mm in length, which is about  $\frac{1}{3}$  the length of *L. grandis*. On the other hand, *Nepa rustica* Fabricius, 1787 (= *Nepa plana* Sulzer, 1776; see below) is a much smaller insect averaging about 15–17 mm in length, only about  $\frac{1}{6}$  the length of *L. grandis*.

Goeze (1778) listed *Nepa rustica* Fabricius, 1775 as "der Amerikanische Bauer" and *Nepa plana* Sulzer, 1776 as "der platte Wasserskorpion," thus clearly recognizing two species.

Stoll 1780, p. 11 described "Le Paysan Americain", figured on pl. I, fig. I. Later Amyot and Serville (1843: 430) gave Stoll's species the binomial name *Zaitha stollii*. Stoll's citations for pl. I, fig. I include "FABRICIUS [1775] Syst. Entom. pag. 691. *Nepa* 2. *Rustica*" and "GOEZE Entom: Beyträge Tom. II. pag. 177. n. 2 *Der Bauer*". This is clearly an American belostomatid, different from the *Nepa rustica* of Fabricius, 1787, 1794, 1803, which is *Nepa plana* Sulzer, 1776 from India (see below). Lepelletier and Serville (1825: 273) noted that Stoll's pl. I, fig. I did not relate to *Belostoma rustica* (= *plana*) from India.

Fabricius (1787, 1794) listed Stoll, 1780, pl. I, fig. I as a citation for *Nepa fusca* (from India), clearly belonging to the Nepidae of today according to the description and diagnosis, the latter stating "cauda logitudine corporis" or "siphon as long as body" which cannot refer to a belostomatid. This must have been a lapsus because Stoll's pl. I, fig. I is Fabricius' *Nepa rustica* (from America) discussed above. It is impossible to know with certainty what species Fabricius had

before him unless we can tie these descriptions to a specimen.

*Discussion:* While the description of Fabricius could apply to several American species, it appears most likely that the species *Zaitha stollii* Amyot and Serville, 1843, now known as *Belostoma stollii*, is a junior synonym of *Nepa rustica* Fabricius, 1775, which should henceforth carry the name *Belostoma rusticum* (Fabricius) if *Z. stollii* is not conserved.

It also seems certain that Fabricius did not have a specimen of *N. rustica* in his collection or he would not have changed his concept between 1775 and 1781. He did not state which collection possessed the specimen. Zimsen (1964) lists two specimens of *Nepa rustica* in the Fabricius collection from Kiel (now at Copenhagen) and one in London. A search of the Fabrician collection in Copenhagen, and the Banks collection in the Natural History Museum in London reveals that there are two specimens of *Nepa rustica* Fabricius held in each of these, all pertaining to *Nepa rustica* Fabricius 1787, not *Nepa rustica* Fabricius, 1775.

The type-locality of *stollii* given by Amyot and Serville is Cayenne (French Guiana), reestablished as French Guiana with the designation of a neotype by Lauck (1963). The original type-specimen should be the one illustrated by Stoll (1780, pl. I, fig. I) if it could be located, which is unlikely. This figure does match *stollii* reasonably, with the exception that no *Belostoma* species is as rounded posteriorly as depicted.

Laporte (1833: 88) recognized the problem with "*Belostoma rustica* de Fabricius" and its complexity, stating "Sa synonymie est fort embrouillée, et plusieurs espèces ont été confondues sous ce nom." He gives three entries in support, two of which indicate the synonymy of the two species Fabricius described under the name *rustica*, i.e. "1° *Sphaerodema rustica*. — *Belostoma rustica*. Fab." and "3° *Belostoma rustica*. — *Nepa rustica*. Stoll." On page 18 LaPorte gives "*Belostoma rustica*. Fab. 106, 3." (referring to the redescription of *Nepa rustica* in Fa-

bricius, 1803) as the type of the genus *Diplonychus*. This is his only reference to a Fabrician description of *rustica* and fixes the taxon of entry 1° as the Indian species. Entry 3° ties "*Belostoma rustica*" to Stoll's citation of *Nepa rustica* Fabricius, 1775, the American belostomatid. (Entry 2° deals with a supposed misidentification of *rusticus*, which is not relevant here.) Thus in a very terse way, Laporte sorted out the two species that Fabricius had described under the single name *Nepa rustica*, and showed that he clearly understood one was the American species described and figured by Stoll, the other was the Indian species given in Fabricius' *Systema Rhyngotorum* (1803), and that these two belonged in different genera.

Herrich-Schaeffer (1849; vol. 9, p. 35) gives under *Zaitha stollii* Amyot and Serville the synonymy "Stoll. 11. pl. I. Fig. I. *Nepa rustica*.—F. Syst. Ent. pg. 691, non Ent. Syst." thus attributing the species to Fabricius (1775) and recognizing that Fabricius' later (1794) description of *Nepa rustica* referred to another species (see *Diplonychus planus* below). The provenance is however given as Mexico, so the specimen figured by Herrich-Schaeffer may not be the correct species.

Mayr's (1871) concept of this species is certainly incorrect or at least confused. Possibly he was dealing with several species. He says that *stollii* comes from North America ("aus Nordamerika stammenden") and that two type specimens are in Signoret's collection. He also synonymizes *Zaitha indentata* Haldeman with *stollii*, however *indentata* is a species in the genus *Abedus*.

Walker (1873) lists *Nepa rustica* Fabricius, 1775 as synonymous with *stollii*, probably following Stoll (1780).

### *Diplonychus planus* (Sulzer, 1776),

#### NEW COMBINATION

*Nepa plana* Sulzer, 1776: 92, Tab. X, Fig. 2. Provenance, "aus Amerika", in error.  
*Nepa plana*: Goeze, 1778: 177.

*Le Scorpion-Aquatique* Plat. Stoll, 1780: 36, pl. VII, fig. VI, fig. A.

*Nepa rustica* Fabricius, 1781, vol. 2: 333. Provenance, Coromandel, South India.

**Misidentification** (see discussion below).

*Nepa rustica* Fabricius, 1787, vol. 2: 276. Type locality not given. **Misidentification or Junior homonym** of *Nepa rustica* Fabricius, 1775 (see discussion below). (= *Nepa plana* Sulzer, 1776)

*Nepa rustica*: Roemer, 1789: 79, Pl. X, f. 2.

*Nepa rustica*: Gmelin, 1790: 2121. (= *Nepa plana* Sulzer, 1776)

*Nepa rustica*: Fabricius, 1794: 62. Provenance, Coromandel, South India. (= *Nepa plana* Sulzer, 1776)

*Nepa rustica*: Turton, 1801: 607.

*Nepa rustica*: Fabricius, 1803: 106. (= *Nepa plana* Sulzer, 1776)

*Nepa rustica*: Latreille, 1804: 283.

*Nepa rustica*: Olivier, 1811: 189.

*Belostoma rustica*: Latreille, 1817: 397.

*Belostoma rustica*: Lepeletier and Serville, 1825: 273.

*Belostoma rustica*: Latreille, 1829: 206.

*Diplonychus rusticus*: Laporte, 1833: 18.

*Sphaerodema rustica*: Laporte, 1833: 83.

*Diplonychus rusticus*: Burmeister, 1835: 194.

*Diplonychus rusticus*: Blanchard, 1840: 92.

*Diplonychus rusticus*: Amyot and Serville, 1843: 436.

*Diplonychus rusticus*: Herrich-Schäffer, 1845: 27, figs. 801, 802.

*Diplonychus rusticus*: Herrich-Schäffer, 1849: 38.

*Sphaerodema rustica*: Spinola, 1850: 48.

*Diplonychus rusticus*: Uhler, 1860: 231.

*Diplonychus rusticus*: Mayr, 1863: 362.

*Nervinops rusticus*: Dufour, 1863: 399.

*Appasus marginicollis*: Dufour, 1863: 399.

*Diplonychus rusticus*: Mayr, 1868: 188.

*Diplonychus rusticus*: Stål, 1870 [1871]: 706.

*Diplonychus rusticus*: Mayr, 1871: 438. (? = *Nepa plana* Sulzer, 1776)

*Diplonychus rusticus marginicollis*: Mayr, 1871: 438.

*Sphaerodema rusticum*: Montandon, 1900: 265. (= *Nepa plana* Sulzer, 1776)

- Nepa plana*, Montandon: 1900: 265.  
*Sphaerodema rusticum*: Distant, 1906: 36.  
 (? = *Nepa plana* Sulzer, 1776)  
*Diplonychus rusticum marginicollis*: Distant, 1906: 36.  
*Diplonychus rustica*: Kirkaldy, 1906: 151.  
 Fixation as genotype.  
*Spherodema* (sic) (*Appasus*) *rusticum*: Matsumura, 1913: 94, pl. 11, fig. 3.  
*Sphaerodema rusticus*: Hoffmann, [1925] 1926: 167-176, 2 tab., 1 pl.  
*Diplonychus* (*Appasus*) *rusticus*: Poisson, 1933: 24.  
*Sphaerodema rusticum*: Hoffmann, 1941: 9-11. Catalog. (? = *Nepa plana* Sulzer, 1776)  
*Nepa rustica*: Zimsen, 1964: 304-305. (Fabricius type-specimens)  
*Diplonychus indicus* Venkatesan and Rao, 1980: 299 (syn. Polhemus, in press). Type-locality, Madras, South India.

The above synonymy gives the usage up to 1870, and later references considered important to the nomenclature, plus the various usages and generic combinations of the names *Nepa plana* Sulzer, *N. rustica* Fabricius and synonyms, but does not give all of the roughly 130 references to these names.

*Historical notes:* Sulzer's (1776) figure of *Nepa plana* closely matches specimens currently known as *Diplonychus rusticus* (Fabricius) at hand from south India and other Asian localities, and does not resemble any known American species, so in spite of his statement "... aus Amerika" this insect certainly came from Asia, probably south India. No American *Belostoma* species has the streamlined, non-protruding eyes that are flush with the margin of the head evident in *N. plana*.

Goeze (1778) listed *Nepa rustica* Fabricius, 1775 as "der Amerikanische Bauer" (= *Belostoma stollii* A. & S.; see above) and *Nepa plana* Sulzer, 1776 as "der platte Wasserscorpion", thus clearly recognizing two species.

Stoll (1780) gave a description under "Le

Scorpion-Aquatique Plat, de la Côte de Coromandel", thus fixing the locality as South India. He gives as a reference "SULZER Gesch. Ins. pag. 92 Tab. 10 Fig. 2. *Nepa Plano*." His figures are clearly of a *Diplonychus* species matching *plana*, one of them carrying eggs on the back.

Fabricius in 1781 redescribed *Nepa rustica* as "N. ecaudata fusca, thoracis elytrorumque margine antico albido", followed by "*Notonecta rustica ecaudata, corpore fusco immaculato*. Syst. Ent. 691. 2." referring back to his 1775 work, but giving in addition "Habitat in Coromandel. Mus. Dom. Banks." Because Fabricius referenced his original description of 1775, but gave a new description of a different insect from another continent, this is a misidentification.

In 1787 Fabricius repeated the description of 1781, but dropped the reference to his 1775 work, and referenced instead "Sulz. Hist. Ins. tab. 10. fig. 2" (= Sulzer 1776), and "Stoll. Cimic. 2. tab. 7. fig. VI." (= Stoll 1780), thus naming a new species, and establishing the synonymy of *rustica* F. 1781 and *plana* Sulzer. In this work he does not state the provenance. According to the decision table of Thompson and Pont (in press) this is not a misidentification but an available homonym. Kerzhner (in litt.) is not convinced, however, that this usage is substantially different than that of Fabricius, 1781, and therefore he believes that it is also a misidentification.

Roemer (1789) dealt with *Nepa plana*, using the name *Nepa rustica* F., in a work intended to relate Sulzer's taxa to the names proposed by Linnaeus and Fabricius. He repeated the Fabricius description of 1781, reprinted plate Tab. X from Sulzer (1776) showing *Nepa plana*, gave "Habitat in Coromandel", yet incorrectly gave the reference "FABR. S. Ent. n. 2." which is from Fabricius, 1775, describing an American belostomatid as I have shown above.

Gmelin (1790) repeated the description of Fabricius, 1781 and gave references as

Fabricius (1781, 1787), Sulzer (1776, *Nepa plana*), and Stoll (1780), but not the 1775 work of Fabricius. He also included *Nepa plana* as a synonym, but did not recognize its priority.

Fabricius in 1794 repeated his entry of 1787 but added "*Nepa plana*" in synonymy before the Sulzer entry, and also added "Habitat in Coromandel saepe ova aggregata, erecta in dorso circumferens Mus. Dom. Banks." He redescribed *Nepa annulata* in this work, and stated his *rustica* to be "Praecedentibus minor." Fabricius, 1803 has a similar entry to that of 1794.

Turton (1801) gave the first description in English, referencing only Stoll (1780), and gave the habitat as Coromandel.

Montandon (1900) discussed these taxa and proposed the synonymy of *Nepa rustica* Fabricius, 1803 and *Nepa plana* Sulzer, 1776, but this proposal has been ignored by later workers.

Both Mayr (1871) and Distant (1906) recognized that *Sphaerodema rusticum* and *Nepa plana* Sulzer were possible synonyms, marking the latter entry under *rusticum* with "? *Nepa plana* Sulz". Both also listed *Appasus marginicollis* Dufour 1863 as a variety of *rusticum*. Since Distant (1906) no modern author has dealt with the species group synonymy of this genus as far as I can determine, although Lauck and Menke (1961) gave a generic synonymy, recently revised by Polhemus (in press).

Hoffmann (1941), in his catalogue of aquatic Hemiptera of Asia, listed "? *Nepa plana* Sulz." first, then Fabricius, 1794 as the first entry for *Nepa rustica*. In this he was probably following Distant (1906).

*Lectotype designation:* A search of the Fabrician collection in Copenhagen and the Banks collection in the Natural History Museum in London reveals that there are two specimens of *Nepa rustica* Fabricius held in each of these, all four pertaining to *Nepa rustica* Fabricius, 1787. I have designated a lectotype from the pair in the Banks collection, and it is so labelled; the others are paralectotypes.

*Discussion:* As shown above, there are two reasons why the taxon currently known as *Diplonychus rusticus* (Fabricius, 1787) (also given often as 1794 or 1803) must be referred to as *Diplonychus planus* (Sulzer 1776) unless some action is taken by the ICZN; 1) the former name, originally *Nepa rustica* Fabricius, 1787, is a junior primary homonym of *Nepa rustica* Fabricius, 1775, and 2) it is a junior synonym of *Nepa plana* Sulzer, 1776.

The only defensible reason for previously failing to recognize the synonymy of *N. plana* Sulzer, 1776 and *N. rusticus* Fabricius, 1787 would be the mistaken belief that Fabricius' Indian species dated from 1775, not 1787 as I have shown.

A petition to the ICZN has been prepared to conserve the name *Nepa rustica* Fabricius, 1781. The ICZN will also be asked to suppress the name *Nepa plana* Sulzer, 1776 and to suppress the usage of *Nepa rustica* before 1781, thus eliminating the latter as a probable senior synonym of *Zaitha stollii* Amyot and Serville, 1843. It is particularly important to conserve *Nepa rustica* Fabricius (= *Diplonychus rusticus*) because it is the type of the genus *Diplonychus* Laporte, 1833, and the best known and most widely cited Old World belostomatid.

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